



# Our Warming Oceans

## Background

Climate change is making our oceans warmer and warmer. Although this might make swimming more fun for humans, it means big changes for our neighbors who live in the ocean. Some animals can only live in certain water temperatures, while others thrive in a range of temperatures.

How will our marine communities change over the coming years and decades as our oceans warm more and more?

## Supplies

- Trifold display felt board, or three pieces of large paper that can be spread out on a flat surface
  - If making a felt board, you'll also need Velcro strips to attach to the animal cards
- Printed animal info sheet and cut-out animals (see below)
- Written or printed labels: 55, 65, and 70

## Guiding Questions

- Which animals will struggle in warming oceans?
- Which animals will thrive in or arrive with warming oceans?
- How will these changes affect humans?



# Our Warming Oceans

## Instructions

- Using a trifold display or pieces of paper, label three vertical spaces with 55, 65, and 75 degrees Fahrenheit.
- These three spaces represent summer ocean temperatures in Boston Harbor as the oceans warm due to climate change.
- Shuffle the printed animal cards and put them in a pile in front of your display.
- Sort the animal cards into the different ocean temperatures that they can live in.
- Discuss with friends and family what you've found. Which animals prefer which temperatures? What might this mean as the oceans continue to warm? How could this affect humans?
- For an even deeper discussion, explore the different predator and prey relationships between these marine animals. How might one animal's changing population affect another's?

## Resources

- Climate Change in the Northeast U.S. Shelf Ecosystem [fisheries.noaa.gov](https://fisheries.noaa.gov)
- Ocean data including water temperature from NOAA Buoy in Massachusetts Bay [ndbc.noaa.gov](https://ndbc.noaa.gov)
- Know Your Ocean: Ocean Warming from Woods Hole Oceanographic Institute [whoi.edu](https://whoi.edu)
- Gulf of Maine Explained: Causes & Impacts of Rapid Warming [gmri.org](https://gmri.org)



# Warming Waters

## Frequently Asked Questions

### What is causing our oceans to warm?

- Greenhouse gases like carbon dioxide and methane trap heat from the sun in our atmosphere, causing the air and the ocean to warm.
- The warming climate is also melting ancient glaciers, causing sea level rise and changing the course of ocean currents. The currents are bringing warmer and cooler water to new places.

### The Gulf of Maine warming faster than the rest of the surface of our world ocean. Why?

- There are two main ocean currents that pass through the Gulf of Maine: the Gulf Stream brings warm tropical water northward, and the Labrador Current transports cold water south from the Arctic. Scientists have observed that the Gulf Stream has gotten stronger, while the Labrador Current is weakening, resulting in more warm water being brought to our region.
- Underwater, the ocean floor of the Gulf of Maine is shaped like a bathtub, with a deep center and shallow barriers. Warmer waters from the Gulf Stream enter the Gulf of Maine and stay there for long periods of time.

### Why does it matter that the Gulf of Maine is warming?

- Warm water takes up more space than cold water. That means that as the Gulf of Maine continues to warm, sea levels will rise. This will lead to even more flooding in coastal communities.
- Native species that call Boston Harbor home, like the iconic American Lobsters, are migrating away in search of cooler water. Warm water species like Blue Crabs are becoming more common in the Gulf of Maine. Local fishers and researchers are already seeing these changes.

### How can I learn more and help build resilience against warming atmosphere and oceans?

Scan the QR code to visit our website, and subscribe to our newsletter to stay updated on ways to get involved with our research and programs.



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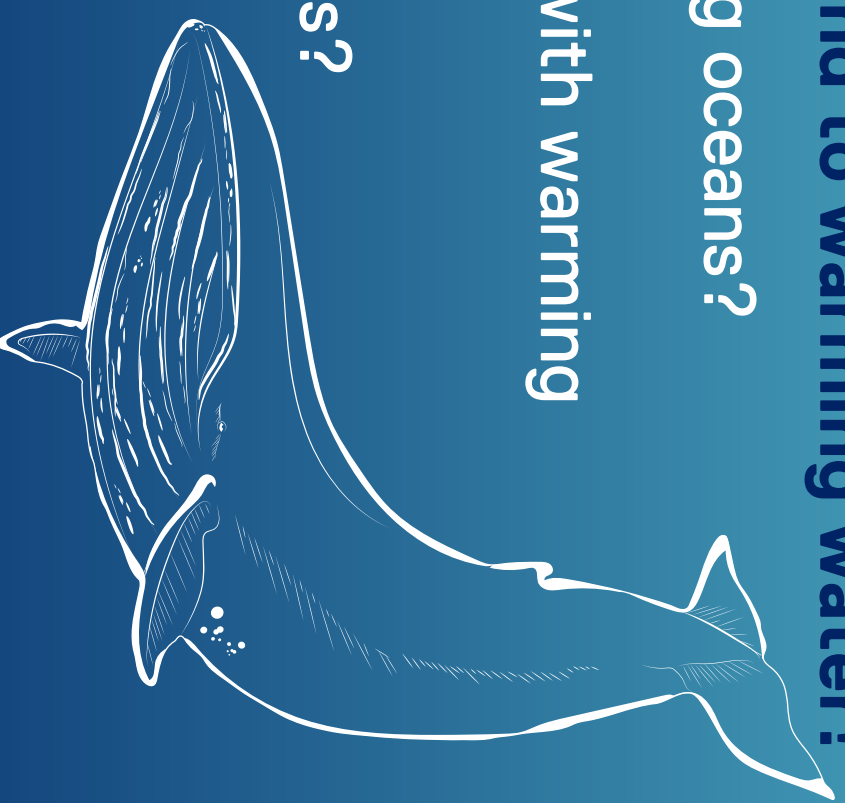
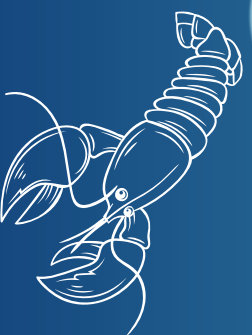


**Explore how local species will respond to warming water!**

Which animals will struggle in warming oceans?

Which animals will thrive in or arrive with warming oceans?

How will these changes affect humans?









# White Shark

*El tiburón blanco*



Favorite foods: fish & seals

Favorite temperature: 50 - 80°F

# Green Turtle

*La tortuga verde*



Favorite foods: seagrass & algae

Favorite temperature: 68 - 80°F

# Alewife

*La Pinchagua*



Favorite foods: plankton & shrimp

Favorite temperature: 60 - 68°F

# American Lobster

*La langosta*



Favorite foods: crabs & mollusks

Favorite temperature: 54 - 64°F

# Blue Crab

*La jaiba azul*



Favorite foods: clams & dead fish

Favorite temperature: 47 - 75°F

# Striped Bass

*La lubina rayada atlántica*



Favorite foods: small fish & crabs

Favorite temperature: 55 - 68°F



Stone  
Living Lab





## Common Octopus

*El pulpo común*

Favorite foods: crabs & fish

Favorite temperature: 55-82°F



## Horseshoe Crab

*El cangrejo herradura*

Favorite foods: clams & mussels

Favorite temperature: 59 - 68°F



## Humpback Whale

*La ballena jorobada*

Favorite foods: krill & small fish

Favorite temperature: 69-82°F



## Atlantic Bay Scallop

*La vieira del atlántico*

Favorite food: phytoplankton

Favorite temperature: 30 - 89°F



## Harbor Seal

*La foca común*

Favorite foods: Alewife & Striped Bass

Favorite temperature: 50-75°F



## Lion's Mane Jellyfish

*La medusa melena de león ártica*

Favorite foods: small fish their eggs

Favorite temperature: 32 - 68°F



## Long-Claw Hermit Crab

Cangrejo ermitaño  
de pinzas largas



Favorite foods: microcrustaceans & algae

Favorite temperature: 75 - 85°F

## Slipper Snail

El caracol zapatilla



Favorite foods: phytoplankton & detritus

Favorite temperature: 72 - 77°F

## Sea Lettuce

Lechuga de mar



Favorite foods: nitrogen & phosphorus

Favorite temperature: 59 - 77°F

## Irish Moss

El musgo de Irlanda



Favorite foods: sunlight

Favorite temperature: 60 - 70°F



# IUCN Conservation Status Key







